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ROUND TABLE

Strategy to usher in the next phase of growth in the Indian IT industry

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Abstract While the Indian IT/ITeS sector has registered tremendous growth over the last two decades, the viability of the growth models adopted by the IT organisations is now in question. This article, in its first part, assesses the value pyramid of the Indian IT services and in examining the avenues of growth up the value chain, suggests that the industry's involvement in inclusive growth and holistic development of society is imperative in the journey forward. A discussion with industry practitioners in the second part of the article throws light on the strategies and initiatives being taken in the industry to meet the challenges and opportunities going forward.

Introduction

Since the formative years of the early 90s, it has been a dream journey for the Indian IT industry. From close to USD 150 million in revenue in FY1992 to estimated USD 88 billion in FY2011, growth multiples have been phenomenal. The Indian IT Industry has provided direct employment to approximately 2.5 million people and indirect employment to 8.3 million. The industry's contribution to the Indian economy has been consistently growing over the last two decades. IT sector revenues have grown from 1.2% of India's GDP in FY1998 to an estimated 6.4% in FY2011. The industry accounted for 26% of India's exports in FY2011 from less than 4% in 1998 (NASSCOM, 2011).

The IT Industry has been instrumental in placing Indian industries on a global map. Indian IT companies have a presence in fifty two countries and currently employ more than 60,000 foreign nationals on their rolls. The Indian IT Industry has nurtured diversity and inclusivity. Fifty eight percent of the workforce in the industry belongs to Tier2 and Tier3 cities; 31% of the workforce consists of women and 5% of the workforce belongs to the economically backward class (NASSCOM, 2011).

The growth of the Indian IT industry has largely been enabled by the availability of skilled and economical manpower. The service delivery model and the financial model adopted hitherto by the IT organisations are

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predominantly linked directly to the scale of manpower. In this scenario, revenue growth meant proportionate increase in headcount. On an average, an Indian IT organisation adds about 20,000 software professionals for additional revenue of USD 1 billion (Joseph & Sabharwal, 2011). With the industry having attained significant scale, serious questions are being raised on the viability of this model for sustaining future growth. Talent scarcity and the increasing size of IT organisations are two major reasons defining the need to evolve an alternative model for sustaining the growth of the Indian IT industry. The Indian IT industry is also facing competition from other low cost locations on the globe. With the wider acceptance and adoption of services from the Indian IT industry, customers' understanding and knowledge of the area has also improved. Educated buyers are now demanding higher value for money. Technological advances are mounting further pressure on the current paradigm and also creating new possibilities and opportunities. The revenue growth trend for the top five Indian IT companies over the last five years is showing moderation in comparison to superior growth experienced for a decade prior to this period.[1] With wage inflation and wild fluctuation in currency exchange rates in the globally connected world, predicting profitability has become an increasingly tough task.

Clearly, the industry is at the crossroads. It would be worthwhile to see what the industry is thinking from the strategy perspective to bring in the next phase of growth. This paper and the panel discussion that follows it, try to bring academic and industry perspectives on the opportunities in the future and how leading organisations that comprise the barometer of the industry are bracing themselves to take on these challenges and shape the future.

Value pyramid and journey of value offering

The value pyramid of Indian IT services can be broken down into several levels. The base comprises activities like data entry, support of non-core applications and systems, and management of legacy systems that expect very low ownership levels of services rendered. The level above the base comprises a stack of services that have slightly higher ownership expectations such as discrete work packets or smaller projects followed by increased ownership levels involving program level execution wherein Indian IT companies are expected to bring in the entire gamut of skills across the software development life cycle (SDLC). At subsequent higher levels, the value pyramid comprises managed services with an even higher level of ownership with expectation of delivering to agreed service levels with customers. At the highest level, the value pyramid comprises high end activities like IT strategy consulting, business intelligence and analytics, and engineering design services (See Fig. 1).

In the 1980s and early 1990s, the industry primarily focused on deployment of workforce at client locations and the utility of the staff was left to the clients. The value offered by such an engagement model, hence, largely depended on the awareness levels of customers and varied widely. The opening up of the Indian economy for global trade after the economic crisis in the early 1990s helped Indian IT companies to think beyond onsite staff augmentation. Encouraged by multiple policy actions, many of today's IT industry leaders that were still in the nascent stage at the time, started to build offshore delivery centres that began offering the services remotely, which until such time had been considered a distant dream. Many global business houses, mostly the leaders in their respective industries, recognised the benefits of tapping the potential of offshore delivery centres and became early adopters of the offshore delivery model which later on became known as the 'global delivery model' (GDM).

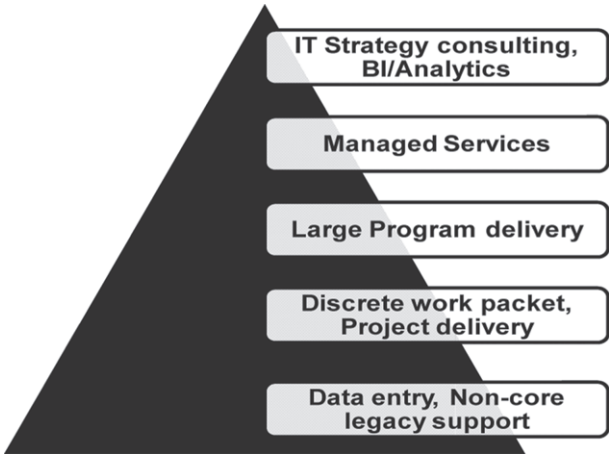

Fig. 1 IT services value pyramid.

Employment readiness of graduates from different engineering disciplines was enabled by designing specialised curriculum to develop IT skills and provision of training to the graduates. Indian IT companies turned their attention to large scale hiring of fresh engineering graduates with high aptitude and built a strong learning culture to make them vocation ready. Indian companies invested significantly in process excellence programmes and achieved high global accreditations like ISO, CMM, and PCMM etc. Process excellence helped Indian IT companies improve the predictability in the delivery of their services. Improved predictability in turn enhanced the confidence of customers in the delivery capabilities of Indian IT companies. Indian companies were awarded with discrete work packets and projects that shifted some ownership to them.

Working on these relatively smaller projects gave Indian companies visibility to larger programmes. Indian IT companies started developing skills required for larger programmes and started investing in developing all round capabilities to address the entire SDLC. This resulted in focus shifting to developing deeper skills in every stage of the life cycle. Centres of excellence were built around these competencies that came to known as 'horizontals' and ran across different regional/industry divisions within these IT companies. Customers felt more comfortable awarding large turnkey IT programmes to Indian IT companies and Indian companies started moving into higher levels of the value pyramid.

[1] Based on an analysis of the annual reports of Infosys, TCS, Cognizant, WIPRO and HCL.

Resilience of early 2000s and subsequent dominance

In early 2000s, GDM was accepted to be a successful model and globally customers started shifting more accountability to Indian IT companies. Global business houses started employing the services of consulting companies specialised in IT vendor selection to move large chunks of work, at times a significant portion of their IT division, to Indian IT companies. These opportunities were termed as 'Managed Services Contracts' (MSCs) with service providers getting end-to-end execution responsibilities to manage significant portions of the client's IT division. MSCs were awarded with clear expectation of Service Level Agreements (SLAs) that were at times linked to the commercials. Indian IT companies competed against the significantly large global players and won many MSCs which offered huge cost advantage to their customers. Recognising the pricing disadvantage resulting from large operations in high cost locations, the large global IT services players were forced to set up their own offshore facilities and capabilities in India. With increased awareness of the opportunities across the technology industry, the Indian workforce started developing superior competencies in the areas of product development. Even in-house IT divisions of large global business houses wanted to benefit from the offshore advantage. As a result, the Indian IT industry grew by leaps and bounds.

Having occupied most of value pyramid, the Indian IT industry shifted its focus to the apex of the value pyramid and started building consulting capabilities. Investments were made in developing competencies in services associated with business intelligence and analytics that needed superior business and IT skills.

While the Indian IT industry offered services across the value pyramid, the global financial crisis in 2008 changed the world in an unprecedented way and growth came to a grinding halt. It led to significant changes in the expectations of clients from the IT services industry. Customers started demanding transformative value propositions that went beyond cost arbitrage. Knowledgeable customers developed a better understanding of the cost structures of Indian IT companies. With the tightening of wallets and absence of incremental value discovery from the service providers, bargaining on the price has now become the norm and this is placing pressure on the profitability of Indian IT companies. Protectionism is slowly making a comeback into the political agenda. Hitherto growth regions like the US and Europe are witnessing stagnancy due to the prevailing weak economic conditions. Wage inflation in India is putting additional pressure on the bottom-line of the companies. Infrastructure inadequacy among Tier2 and Tier3 cities in India has delayed further discovery of cost leverage that could have given greater profit advantage to Indian IT companies. Most large organisations have reached a level of scale beyond which there is little or minor efficiency gain from the economies of scale. Competition is intensifying and customers have multiple choices.

The current performance of the Indian IT industry suggests that the industry has slowed down and will need to find alternative ways to sustain its growth. In the remaining part of the paper we discuss various strategic possibilities for the Indian IT Industry to enhance its rate of growth and continue to make contributions to the growth of the Indian IT economy.

Growing up on the value chain

Growing up on the value chain implies that a vendor adds input which enhances the quality of output which can be quickly appreciated by a customer and the customer's customers. Services that enable superior business outcomes for customers are considered to be of high value services and customers are willing to pay a premium for such services. Among the several available options, three such high end services — consulting, platform based services, and business intelligence and analytics are worth discussing.

Indian IT service providers have been successful in delivering application development and maintenance (ADM) services, as is evident from the composition of their revenue from ADM services as a percentage of total revenue (Infosys, 2011; TCS, 2011). This dominance in one part of the services space has resulted in Indian IT service providers being branded implicitly as ADM experts. In the past, there was reluctance to grow up on the value chain because of multiple reasons. Firstly, customers were not keen to offer high end value work to Indian IT companies. It was partly due to the fact that the customers wanted to retain high end work for their own employees and partly due to lack of confidence and trust in the Indian vendors. Indian companies did not have enough consultancy competencies and the local expertise with superior understanding of the customers' business context. Often, having hardware, software and service capabilities further facilitates offering total solutions which are valued by a customer. Indian companies did not invest in a big way to develop products because many of them became big offering services and hence were reluctant to enter into the product domain. Lack of big markets and big customers who could support software products was another reason for reluctance to invest in product development.

Fully integrated technology solution providers like IBM and HP who have hardware, software, services and consulting arms have built a significant offshore presence in India to neutralise the cost and competence advantage offered by India that was earlier limited to Indian IT service providers. These companies have not only offered tough competition to Indian IT service companies in the global markets, but have also got a much bigger share of the Indian IT market as compared to many Indian IT services companies. Leading IT service providers from India are beginning to invest in platform based services. Platform based services can act as a proxy to product play from Indian IT services organisations. With the superior knowledge gained over the last two decades by managing a large number of custom applications, Indian IT companies are better placed to identify the gaps or customisations necessary in products available in the market. This understanding can be turned into a competitive advantage while developing platforms. 'The focus on platforms has worked as a strategy for us to move towards outcome-based pricing', claims Sanjay Purohit, senior vice-president, global head of products, platforms and solutions, Infosys

(Khicha, 2012). Complete technology solution providers like IBM, HP and Oracle have an advantage in offering platform based solutions. With the control over hardware and software, they have an inherent advantage to design the service architecture which can meet the customer's requirements. Hence, Indian IT companies either need to acquire these resources inorganically by mergers and acquisitions or take the initiative in developing better cooperation with organisations having complimentary resources.

The revenue growth and the manpower growth data for the top four Indian IT majors, TCS, Infosys, Wipro and HCL Technology for the period FY 2005—2011 are given in Table 1. The data suggests that there are differences in productivity per employee even among the Indian IT companies.

From the analysis of HCL which is the best in terms of revenue growth outdoing the headcount growth, it can be concluded that investment in high end consulting is one of the major contributors to improved revenue per employee. HCL acquired the UK-based business transformation consulting company Axon which was a significant player in SAP consulting in 2008. HCL's per employee revenue base has grown over 51% in the last five years (Joseph & Sabharwal, 2011).

Business analytics

With IT moving from being an enabler of business to a definer of business, there is tremendous data explosion. Estimates suggest size of digital data will touch 35 zettabytes by 2020 (Erickson, 2010). The IT industry is staring at another huge opportunity of making sense of all this data. Most IT firms have developed capabilities in business intelligence (BI) and analytics. The success of these efforts will depend upon the ability of consultants to understand the underlying business and the market dynamics and to develop heuristics that provide valuable insights for superior decision making by the organisations. Considering that these decisions can be tied directly to business outcomes, such solution offerings can create non-linear revenue streams for IT organisations. The consultants with intimate knowledge of local business conditions and impact of global developments will be critical to the success of these investments.

Private enterprises have been investing significant resources in BI and analytics to gain precious business insights that can improve the productivity of their people and plants or understand their customers intimately to enhance and offer their product and service offerings. However, there is a huge opportunity that exists in implementation of BI and analytics in the public sector. Increasingly, government agencies are under pressure to take up more accountability for every tax rupee and deliver effective public service (Business Intelligence for Public Sector/Government, n.d.). Public scrutiny and audits from governmental agencies are resulting in policy makers investing considerable time before making decisions. Lack of credible systems to analyse enormous citizen data to improve the decision making of policy makers is also one of the detractors to the progress of quicker policy action. Effective adoption of BI and analytics and subsequent improvement in accuracy of information analysis will only bring better insights into the requirements of the citizen and the impact of a policy. Evidence based decision making also increases the confidence of a policy maker in making the decision swiftly. This has a direct impact on the country's overall growth and progress of the society. Public distribution systems, impact of welfare programmes on people of various economic strata, education and healthcare are only a few important sectors where BI and analytics can play an important role. IT companies can explore this opportunity and create products and solutions that can become the backbone of policy making.

Nurturing domestic market and inclusive growth

The consumption of IT services in the Indian market is much lower than that of developed economies. The existing domestic consumption of IT services in India for the financial Year 2011 was about USD 18 billion at a growth rate of about 17%. Comparatively, domestic consumption of IT services in China moved from USD 6.3 billion to USD 57.9 billion from 2000 to 2006 (Gregory, Nollen, & Tenev, 2009). Thus there is a need for and the possibility to accelerate the rate of consumption of IT in the Indian domestic market. Finding ways to leverage the domestic market would be the next crucial task for most IT businesses operating in India to sustain their growth.

The Indian IT industry in collaboration with the government and industry should focus on inclusive growth. The objective of inclusive growth is to ensure that there is reduction in poverty and corruption, accessibility to basic needs, affordable healthcare and education, basic infrastructure development, generation of employment, good governance, environment sustainability, rural transformation and agriculture development (Deloitte, 2011). Inclusive growth initiatives should facilitate integrating urban and rural India which in turn will ensure availability, accessibility, quality, transparency, accountability and affordability of products and services that would benefit all segments of the population. In addition, the IT organisations should use the emerging technology to reach out to small and medium size businesses. IBM's pay-as-you-go cloud based solutions and TCS's iON platform are two examples of how the IT industry can reach out to small and medium size enterprises in Tier-2 and Tier-3 cities in India.

Table 1 Cumulative average growth rate for revenue and manpower for the period 2005—2011.

Name of the company	TCS	Infosys	Wipro	HCL
CAGR in Revenue for the period FY 2005—2011	22.4	24.9	25.2	29.2
CAGR in Manpower for the perior FY 2005—2011	27.7	23.6	19.6	20.8

Source: Based on the data from Khicha (2012).

Inclusive growth through IT will require that every stakeholder, namely, government, public and private sector, and civil society should contribute with their unique competencies and resources. The government and the state must play a crucial role in providing basic infrastructure such as rural connectivity, electrification, broadband access etc that would encourage various private firms to set up operations and cater to the local needs. Civil society such as grassroot NGOs should pitch in by providing the required outreach as they have the maximum network connectivity and understand the pulse at the bottom of the pyramid. IT companies can use technology and human capital to make their contributions to achieve the objectives of inclusive growth (Deloitte, 2011). The following sections highlight some of the areas where IT could play an innovative role in bringing about inclusive development.

Governance

In the recent past, there has been a change in the overall citizen mood towards the democratic functioning of the country. Questions related to transparency, accountability and efficiency are being raised by the citizens in most of the public service delivery processes. Citizens today are increasingly becoming tech-savvy owing to greater awareness and better connectivity of technology. The government has been implementing various e-governance plans through IT solutions. As per NASSCOM, the Indian government's IT expenditure is expected to reach USD 5.1 billion during the FY 2011—2012 (Indian IT Industry Overview, 2009). The main catalysts for this growth are the national projects such as the National e-Governance Programme and the Unique Identification Development Authority of India (UIDAI). The UIDAI project is touted to be an initiative that would assign unique indentification to every Indian citizen which in turn will lead to efficient delivery and monitoring of public services to the lowest strata of the society.

However, most of these public service delivery mechanisms lack sufficient monitoring of their end to end implementation. Most state government portals have gone online but there still remains the last mile to reach in terms of achieving the desired outcome. Content creation is one aspect of e-Governance but making the same available and accessible 24/7 to citizens leaves much scope for change. Services such as application for a ration card, voter's ID, gas connection, passport application, utility bill payments, RTO services, property tax payment etc all have been automated but not completely implemented end to end. It is here that the IT industry has to take on a bigger role and responsibility to ensure that the capital and resources invested in IT produce desired results. They must examine and diagnose the existing implementations of IT projects in public domains and answer the following questions:

- How can technology help in not just content creation and aggregation but also in ensuring constant access and availability?
- How can we eliminate the need for unscrupulous middlemen by ensuring a reliable and accessible service delivery platform?
- How can the IT sector develop accountability and transparency in services delivered by government agencies?
- How can we use the power of the Internet and mobile devices to deliver government services to the citizens located in the remotest part of the country?

Energy and power utilities

The meteoric rise of the economy and the associated spurt in income has accelerated the consumption of and demand for energy and power resources. The main hurdles faced in this sector are high distribution losses, inefficiencies in power usage and theft (Deloitte, 2011). It is the major infrastructure hole that needs to be plugged for which the government is now open to acquiring IT expertise. According to the CMRIndia report (2011), the government plans to invest heavily in IT/ITeS services through various IT applications like 'Energy Accounting & Auditing, Supervisory Control and Data Acquisition (SCADA) systems, MIS, Integrated Meter Reading (Billing & Collection), Automatic Data Logging System, GIS mapping, Automatic Meter Reading and Prepaid electricity' to combat power transmission and distribution issues.

There are many opportunities for increased participation by the private sector to help bridge the widening energy gap on a national scale. Firstly, there needs to be stronger regulation for monitoring and usage. Secondly, there needs to be collaboration between the government and the private sector to devise applications that not only automate monitoring mechanisms but also address environmental sustainability issues.

Healthcare

The rural healthcare in India is yet another segment that is witnessing huge supply versus demand challenges. Presently, most of the healthcare requirements in the rural segment are met by small government clinic facilities and nursing homes that often lack adequate infrastructure facilities. About 70% of the Indian population resides in the rural sector, but reliable healthcare facilities are available only in the urban sector. This further adds to the cost burden for the rural population which aspires for quality and affordable healthcare.

The major hurdle in accomplishing this task has been the absence of a feasible and sustainable business model that not only provides healthcare to the rural population, but also allows for conversion of rural health expenditure into an income generating economic activity (Ravishankar, 2012). The main challenge lies in providing high quality healthcare facilities at a cost efficient price model that reaches out to maximum rural audience. Such a business model requires technology intervention by means of developing healthcare information systems that can manage both the clinical and administrative aspects in an accurate and efficient manner. In addition, the technology should make it possible for specialist doctors to provide consultations to rural population through telemedicine, an illustration being the initiative by Narayana Hrudayalaya Hospital from Bangalore, a powerful case study in the field of telemedicine which reaches out to rural population not

only in India but in other countries as well (ISB Insight, 2007). Other examples include developing a multi-service platform that comprises telemedicine health clinics, basic access to drinking water and sanitation, a diagnostic lab, and a pharmacy (Hamermesh, Sinha, & Vrolyk, 2011).

There are numerous private sector healthcare businesses such as VMWare Solutions, Infosys, Siemens and Glocal Healthcare Systems which are increasingly adopting these measures through the use of open source software or healthcare systems that they have developed inhouse. With the growing interest in application of cloud computing services, it would also be interesting to see how healthcare management services could shift to cloud based applications, thereby reducing the need to invest in heavy infrastructure to manage, store and record various patient information (VMWare, 2011). The challenges that need to be addressed are firstly, how to convince the rural population to discard traditional healers. Secondly, there is a need to create viable long term models which are affordable and offer quality healthcare. Also, there is scope for examining the feasibility of using mobile phones and the Internet to educate the rural population in the field of healthcare and also create possibilities for diagnostics services.

Education

Information technology can play a significant role in overcoming the many bottlenecks (lack of physical infrastructure and lack of teachers being the main) that exist in offering good education, particularly in the rural areas. IT can create intellectual infrastructure and offer services of top-class teachers through the use of mobile phone and the Internet. For instance, Gurukul school in Bihar offers superior classroom experience using Skype technology (Singh & Akbar, 2011). Education companies such as Pearson, Educomp and Everonn have developed online classrooms which can be effectively used in rural areas. IT companies should examine the possibilities of networking a large number of villages using wireless devices and delivering lectures through Skype or other audio—video conferencing facilities. IT based technology initiatives will help deliver quality education in villages and create employment opportunities; additionally they will contribute towards the growth of the business of IT companies.

Governance, electricity and power, healthcare and education are some of the major areas which offer excellent opportunities for effective application of IT for inclusive growth as well as sustaining the growth of the IT companies. Implementing these initiatives will require a mindset change for the IT industry. They have to increasingly look at the local environment as an opportunity and explore the possibilities of using IT knowledge rather than starting with the technology and looking for areas where it can be used to benefit the masses.

IT for small and medium size business

According to the Zinnov report (2012), India is home to around 50 million small and medium scale businesses (SMB) of which over 11 million are expected to become technology ready by the year 2015. This is supported by the fact that the IT adoption in the SMB segment is growing at 15% and expected to reach USD 15 billion by 2015 (Gartner, 2011). Innovations in computing technology are making them realise the benefits of improved productivity and efficiency. There is a lot of room for new players who can provide pay-for-use service offerings in this segment (Gartner, 2011).

Traditionally, Indian SMBs have stayed away from IT adoption due to perceived high costs and unclear return on investments. Further, there are more localised challenges in terms of diversity of language, demography and culture. These critical factors would dictate transforming businesses to cater to a more locally oriented market through product localisation and solutions that are in sync with the local work flows and can offer customised packages at a lower cost. Off the shelf software solutions and the 'one-size-fits-all' approach may not succeed here; neither would aping the growth stories of other countries such as China. Tapping the domestic market also offers another advantage in terms of acting as an experimental testing avenue for innovation. Working at the domestic level would allow for the growth of small R&D setups that could provide tailored solutions for the domestic market as they would be in sync with the local challenges and mode of functioning (CII-PwC, 2010).

Nurturing small and medium scale IT industries

The general assumption in the software industry has been that growth in terms of scale is one of the valid measurements of success as increased size brings in associated benefits such as credibility, stability, broader service offerings and thereby the confidence to undertake bigger and more ambitious projects (Aranda, 2002). This has resulted in many of the mid-tier software firms trying to emulate their larger counterparts in a bid to gain the necessary competitive edge in order to gain a foothold in the national and global market. There are more than 3500 companies in the SMB segment and many of these companies are at the forefront of innovation in developing next generation technology products and solutions (Times of India, 2012). Some of the challenges faced by these small and medium scale industries are scalability issues, limited delivery of services and product offerings, lack of credible presence locally and globally, lack of market intelligence, lack of financial aid, lack of resources to invest in developing competencies across multiple verticals, increasing competition from other developing nations and absence of differentiation in offerings (Aithani, 2012). Most of the challenges are due to these firms trying to grow up the value chain by aping the larger IT firms. Rather than trying to adopt the processes and practices of the larger firms, the small and mid—tier IT firms must focus on their strengths. Despite these challenges, the small and medium IT firms can actually play an important role in contributing to the overall IT growth by identifying the need for differentiation and focussing on a specialised competency in niche verticals. Instead of adopting multiple expertise across multiple verticals, the need of the hour for these firms is to re-evaluate their portfolio and trim it down to select core offerings (Times of India, 2011).

Some of the larger IT firms may not provide all specialist services and hence there is scope for niche areas which lack competency building due to smaller market demand. These areas could be outsourced to the smaller IT firms if they build their intellectual property. Secondly, the scalability issue could be addressed if the mid-tier firms focussed on fewer segments and technology areas. They should take advantage of their small size to build up core competencies in one domain and IPs that would help gain credibility in the long run. With the current downturn, clearly customers are seeking out firms which provide core competencies that provide solutions rather than the size and scale of companies. The advantage for the smaller IT segment is to get into 'detailing and hyper-specialisation' in order to differentiate themselves to build their customer base (GlobalServicesMedia, 2012). Thirdly, they must build on their 'local presence' image rather than trying to span the globe as most companies would rather spend for the same service from a local company rather than outsource it (Aithani, 2012).

In order for the mid-tier firms to overcome the challenges, there must be adequate support from the likes of the government and NASSCOM to nurture their growth. As part of its initiative to nurture small and medium size IT firms, NASSCOM has planned the following strategies (Upadhyay, 2007):

- Providing networking opportunities between SMEs and potential customers through trade commissions
- Organising cross border SME delegations
- Organising cross-industry forums for SME interactions
- Tie ups with government for financial patronage for SMEs
- Initiating mentorship programmes with the larger IT firms

Exploring new and emerging markets

Besides the emerging markets, even the relatively mature markets like Japan and the Germanic countries (Germany, Switzerland, Austria) offer new geographical expansion opportunities to Indian IT organisations. As per the NASSCOM study on the matter, Indian companies currently service 5% of the addressable space of USD 53 billion comprising IT, BPO and engineering services (Nangrani & Doshi, 2011). In 2009, the Japanese IT services market was USD 108.6 billion. Only 8% of this IT budget was offshored and India accounted for approximately USD 1.1 billion of the services business. Indian IT companies accounted for USD 0.5 billion of the total IT budget of USD 50 billion from Nordic countries. It received 0.5 billion revenue from USD 60 billion IT budget of Latin American countries. After the economic crisis in the recent past, many nations that have been relatively conservative to offshoring will be compelled to start adopting the model as they recover from the economic downturn. Besides, shortage of local talent skilled in information technology will be the other condition that is expected to force the organisations in these countries to look towards geographies like India that offer a large base of competent talent. Local language skills among the IT skilled workforce will be one of the key differentiators to Indian IT companies benefiting from this opportunity. As long term commitments will have to be made to win the trust of customers in these regions, Indian companies will have to collaborate with local partners to develop the relationship before being accepted as a trusted partner. Cultural compatibility barriers can be effectively overcome by inclusion of significant local talent and effective partnership strategy.

Conclusion

Over the last decade, the aspiration of developing nations has grown consistently, in the process gradually beginning to elevate their societies from the depth of poverty. However, the overall goal of uplifting the society is a work in progress and still in the initial stages. Billions of people across the globe still do not have access to basic necessities. The IT industry with its widespread reach and ability to reduce transaction costs significantly can benefit from this huge opportunity. India, being one such developing nation, presents this opportunity to Indian IT companies. Healthcare, education, town planning and civic services are some of the areas where the Indian IT industry can lead automation and enable people to participate in inclusive growth. The solutions implemented in India can be extended to other parts of the world thereby leading the transformation to a better world. Sustainability and the environment are at the core of every leader's agenda across the globe. These issues are beyond the comfort of choice and are becoming increasingly critical to the very survival of mankind. Significant investments are channelled in this direction for technology led solutions. It presents another big opportunity for the Indian IT industry in leading the transformation of the world.

The initiatives recommended for the industry need to be complemented by the policy actions from the government. Policy encouragement is required in developing a robust small and medium business segment which can become an integral part of the supply chain of the IT industry ecosystem. NASSCOM is actively working on a vision to retain the Indian advantage in the field of information technology by working with the government, industry and academia. It has set up forums focused on building future programmes and sustaining the growth of the industry. Important forums are the animation and gaming forum, emerging companies forum, product forum, quality forum, remote infrastructure management forum and global enterprise product support forum (NASSCOM, 2011). To foster the efforts around creating an enabling ecosystem, NASSCOM has also placed special thrust on important initiatives like diversity and inclusivity initiative, domestic IT market initiative, e-Governance initiative, education initiative and green IT initiatives.

Academia has an equally important role to play in developing superior talent that can keep the Indian IT industry ahead of global competition. Educational institutions should collaborate with the industry to provide finishing school training to bring out graduates who are employment ready. Further, the institutions need to create relevant and valid knowledge that can be used by the industry to nurture innovations. Effective collaboration between the industry, trade associations, academia and the government can help industry to sustain the growth

momentum and to retain the competitiveness of the Indian IT industry.

Strategy to usher in the next phase of growth in IT industry: discussion

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Faculty and doctoral students from IIMB, and invited observers were part of the audience, and participated in the discussion.

N M Agrawal

The Indian IT industry has done extremely well in the last two decades (as illustrated by the figures in the note above) and has had a growth rate of about 30% per annum, barring the last four years. No other industry in India or in any other part of the world possibly has had this kind of growth and the industry can take a very legitimate pride in India's growth.

Having said that, today the Indian IT industry is experiencing unique challenges to sustain its growth. All the large Indian IT companies have to add about 20,000 employees for an increase in sales revenue of about one billion dollars. The top five Indian IT companies employ more than one lakh employees. It is felt that beyond a point, it will be difficult to sustain the growth of Indian IT industry both at the firm and industry level with such a large manpower requirement. Shortage of talent is another important issue. A number of software professionals working in the Indian IT industry seem to be dissatisfied due to lack of interesting learning experiences. It is said that since the industry works mostly on the lower end of the value chain, most of the jobs are in the field of testing, infrastructure maintenance and technical support. Thus, we are now provided with a challenge and an opportunity to take stock of the industry and see what can be done to ensure that the industry continues to retain its growth trajectory and to contribute to society in a significant way.

Information technology helps in generating, storing and using knowledge at the societal, corporation and individual levels. It helps individuals and societies to experience a better quality of life. Information technology also provides a competitive edge to industries which ensures effective and extensive utilisation of the knowledge created by using IT. In the recent past, the consumption of IT services in the Indian market has increased but it is much lower compared to developed economies, and to countries like China. The Indian IT industry in collaboration with the Indian government and industry association should work towards enhancing the domestic consumption of the IT services.

A round table discussion such as this one will help us think through questions such as the respective roles of the IT industry, the government, and society, and the academia in sustaining the growth of the Indian IT industry.

S Balasubramanya

To contextualise Professor Agrawal's comment about whether India can be a large user of IT, I would like to give a few examples of the enormous growth of IT usage in India. In 1992 the National Stock Exchange of India was formally set up through the parliament to bring in efficiency, transparency and ease of execution. Today, stock prices can be checked and stock trading can take place from mobile phones. Even in the government sector, income tax filing and refunds are completely handled by the electronic channel and a recent communication from the Reserve Bank of India (RBI) states that the payments from the government for refunds or benefits need to be made directly to the beneficiaries' bank accounts rather than by issuing paper-based cheques. According to recent news reports, electronic channel payments have outstripped cheque payments and cheque clearing. We were also involved in the single largest solution of automation for the eight banks of the State Bank Group (main SBI and its associate banks in India). Today the system is capable of handling more than 40 million transactions a day (the largest anywhere in the world) as a single platform with the least cost per transaction. These are some indications of the country's readiness for the deeper use of technology.

With that I would like to share some data points. There were only about 300 employees when I joined TCS, and today we are over 225,000 people on a global workforce, on a global platform and more than 100 nationalities working in the organisation across over 40 countries. Over the last 44 years of TCS's existence, we have seen several technology changes, usage changes, new technologies, convergence of computing technology, communications technology, mobile technology, language processing, voice processing, and many forms of usage. Technology is only going to grow further.

Analysis of pure published market data on IT services (Author's source: Gartner Market Share: IT Services, 2010 April 2011) points to a sustained year on year growth of 4%—5% on the demand side of the market across the major geographies from the current USD 810 billion to USD 960 billion over the next 5 years.

Data also suggests that across different service points like BPO, Application Development and Maintenance (ADM),

Integration services, Enterprise Solution, IT and Infrastructure services that are offered by many technology companies around the globe, ADM services comprising of support and upgradation will grow at a similar rate of 4%—5% from current USD 224 billion to USD 264 billion in the next 5 years.

I would like to add to Prof Agrawal's comments on China. The Chinese government has launched a major programme on implementing 'smart' or 'intelligent' cities. We are participating in some of the initiatives to develop several intelligent city components in collaboration with the Singapore Management University (SMU) in Singapore. An 'intelligent city' is one in which the government is a significant spender on the utilities and services provided in the city, such as the tax collection, traffic management, water management, electricity management, gas management, land management, rental management, garbage collection, hospital services, education, etc. More than 50% of the IT industry budget in any country is spent by the government but as we go forward, much of that can be potentially made more efficient, and offered as a service rather than paid for platforms and other components. Huge investments are coming up in the government sector on IT services. Government spend on IT services is expected to continue over the next 5 years (Author's source: Gartner Market Share: IT Services, 2010 April 2011). Government spend of USD 164 billion is higher than USD 142 billion spend from Banking and Financial Services currently. Government spend is expected to touch USD 184 billion by FY 2015.

Applications in healthcare and education are fast growing. Virtual classrooms, teachers and gurus are increasingly becoming inclusive in India. Many contactless devices have enabled rural inclusion of groups such as cobblers, weavers etc. The government can provide money to these people through electronic accounts without any pilferage. The use of technology for improvement of rural employment is going to be an area of concern not only in India, but across the globe. There is a need in our country to educate several million youngsters in many fields including vocational courses and to create an employable workforce. Here again, IT can be used to effectively reach different parts of the country to deliver such training near to the need. This calls for setting up technology enabled training facilities and services including possibly a virtual specialist teacher to provide additional expertise.

Today, the need for employees of the IT industry to travel is very limited. Even in established global companies employees only travel to customer premises when customer facing and constant customer interaction is required. Other industries such as manufacturing and automobiles are on global platforms today. This is one area which we must harness. Nasscom figures on the IT industry in India indicate a 10% employee growth and 18% revenue increase in FY 2010—2011. So, the value per employee is non-linear. The industry must build future ready organisations through sustained investment in training, providing opportunities for career growth, managing people challenges effectively, and ensuring cost competitiveness through continuous productivity improvement.

While there are several new opportunity segments for the use of IT (see Table 2) the key challenge is, as Professor Agrawal mentioned, that people who work on testing in an organisation may not appreciate the nature of their job. But just as we maintain our body for 70—80 years for sustenance, all IT systems must be maintained, tested and enhanced to keep them functional, to adapt to changes in technology and for them to remain useful. The life of a system typically is 10—15 years. We cannot develop or change new core systems for every new technology or device, with every business change or a change in the competitive landscape. More than 50—60% of the effort in the life cycle goes in testing, maintenance and enhancement. Testing is critical and also gives enormous domain knowledge. At times tools have to be used to automate the testing process. This prevents human errors that happen during manual repetitive testing.

Table 2 New opportunity segments.

- New areas like big data, analytics, mining, embedded
- Agriculture, dairy and farming
- Fishing and related activities
- Large scale construction activities
- Variety of newer & deeper usage of IT
  - Social media
  - Mobility
  - Entertainment
  - Medical applications
  - Education
- New growth markets —APAC, Latin America, etc.
- Combination industries driving new demand
- Newer services delivery models
  - Cloud based services —e.g. Ambulance services
  - Context and transaction based services

What is the cost of down time? We did an analysis for the National Stock Exchange ten years ago in which 10 min down time translated to more than $100 million in lost trading business. Even if the exchange were to invest $10 million on a sophisticated disaster recovery system, it is preferable to letting the system down and incurring potential loss of trading business. Central banks in some countries have started demanding financial fines from banks for deficiency in service on electronic channels like ATM, Internet and so on. Similarly, we cannot let bank services go down. These are important systems that we don't build often but which we continue to enhance and use after they are initially built.

Product companies, whether a technology product or domain product, face a challenge in deciding whether to spend more efforts in testing or to go to the market early. The Dbase product company went bankrupt after dbase4 was released into the market, simply due to very early release into the market with significant field errors.

Everybody wants IT service providers to structure a 'pay per use' feature. But the service providers find it difficult to create such a structure due to varying platforms, people, tools etc. Although many of them imply how the services will be delivered in future, such delivery is yet to be seen.

While all industries have their life cycles, as far as the future of the technology services or IT industry is concerned, our country will find enough global business and resources to bring in higher levels of automation.

Sean Narayanan

I will talk about where the IT industry is heading and what needs to be done to usher in the next phase of growth in the IT industry. S Balasubramanya's presentation gave us a good idea on what's happening in the industry and data points around worldwide IT services market size and forecast.

Information technology is still a maturing industry, having evolved from the electronic data processing days in the 1970s, to the advent of outsourcing in the 1980s when India created a bench of skilled labour and deployed a large workforce across the globe. Product realisation emerged in the 1990s where work could be done remotely from another location. Over time, product realisation became commoditised and the Y2K problem came to the fore that required tens of thousands of people working on remediating the Y2K problem during the late 1990s. Next was the advent of dotcoms. This era saw a significant growth in technology spend by businesses and service providers achieving remarkable scale. Telecom companies invested heavily on infrastructure and the IT industry jumped on that bandwagon and near real-time cost effective communication between different locations improved business systems considerably.

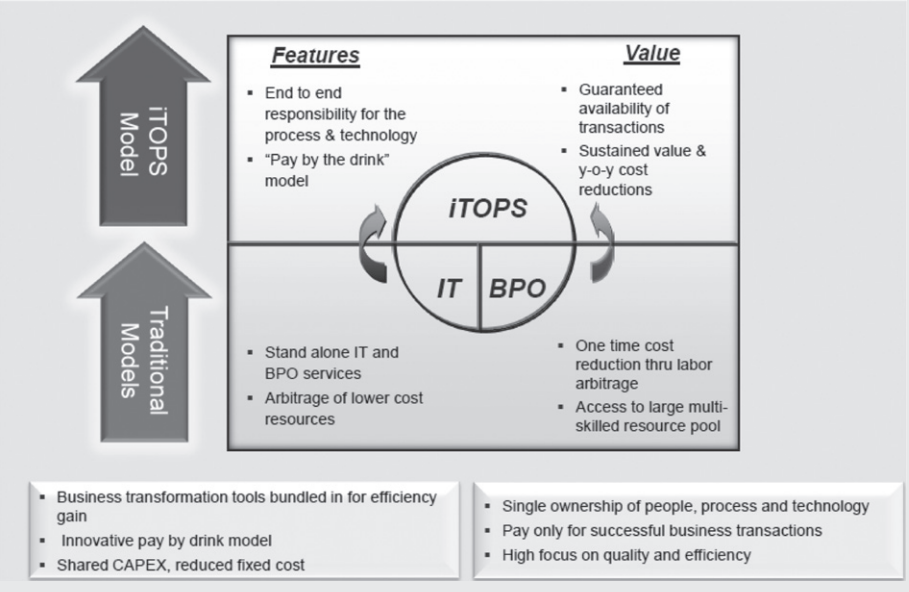
The global recession of 2008 and 2009 led to restructuring of the IT industry and changed the way business is done. Buying behaviour has changed from paying for the effort required to arrive at a solution to paying only for the desired outcome. The IT industry has largely worked on an input based model over the past 20—30 years. But with a changing world today, as S Balasubramanya mentioned, cloud is bought as a service instead of paying for the number of people required to implement it. This aligns with our business model and that's the only way to break the linearity of the traditional 'people and revenue' oriented business model.

With this changing world, the expectation has moved from purely labour arbitrage to labour combined with high quality talent and value. This has necessitated the move to an outcome based model. With the advent of cloud and Software as a Service (SaaS), the movement towards the Indian IT Industry offering outcomes based solutions on a utility model has started to become mainstream.

As Prof Agrawal mentioned, people get bored of working on the same thing, and that might result in a people crunch in the industry. We need to move away from purely writing code to providing solutions catering to the unique business processes of each industry so that the industry recreates itself. The IT industry has moved from a hiring ratio of 1:100 available pool of engineering graduates from campuses to a 1:3 ratio, approximately, today. This has created a crunch of high quality resources in the industry. This has also necessitated newer methods of working and novel methods to grow business with this constrained labour pool. The business outcomes model helps break the linearity between headcount and revenue oriented model which the industry has maintained over the last 30 years. My belief is that over the next four to five years, you will see an alignment between the process and technology. We will sell by the outcome. The customer will pay for the desired outcome such as a more stable system with no outage instead of paying for the manpower required to implement the system. So, an intersection of technology and business is imminent.

Technology is becoming an integral part of people's life and business processes of corporations. Many IT organisations have also started to offer Business Process outsourcing (BPO) to leverage this opportunity. Today, organisations have separate divisions working on IT and BPO because the value for IT today is higher than the value for a BPO. But slowly there is a move towards bringing both of them together. We find more and more IT professionals with a strong understanding of business process and the business with a strong understanding of technology due to high dependency on it. The IT industry is therefore moving towards an integrated technology and operations to help create better solutions (Table 3).

Table 3 Integrating technology with operational processes (iTOPS) model.



Three events that are likely to change and provide opportunities for the industry are: 1) Cloud, 2) Mobility and 3) Social analytics.

Cloud based outsourcing enables Indian IT service providers such as ourselves offer services faster, better and cheaper to customers. Mobile usage for executing work and processes has become common. Building solutions on mobility will become another big opportunity in the IT industry. As we become a more connected world, more and more people are using social networking; sites such as Facebook and Twitter are becoming powerful mediums in social, economic and political situations. The opportunity to leverage information and data in these social networking sites poses an opportunity which can be synthesised and used to leverage any service. The IT industry is going through an inflection point though it is still a maturing industry and is expected to take another 20 years to mature completely. The IT industry continues to be a primary driver for business growth and will continue to grow through recession times. Every time there has been an adversity, the IT industry in India has grown further. The next areas of focus for the industry will be to soundly leverage cloud, social analytics and mobility — these new forces are revolutionising business and society.

S. Rajagopalan

S. Balasubramanya and Sean Narayanan have given you perspectives of large IT companies. I am taking a step back and talking about the equivalent of the self help group in the IT industry. If the banking industry can look at micro financing, can the IT industry look at micro IT? Where is the growth for IT coming from? It can only come from the concerns of the world—food, energy and ecology. How does one translate this as business for IT?

The proposed Food Security Act of India entitles an annual expenditure of Rs 75000 crores ($15 billion). How much of it is the IT component and what are its implications? There has been an explosion in the number of users in this field. In 1981, a telecom ministry survey said that 50% of the Indian population had not made or received a single telephone call in their entire life. That was only thirty years ago. Today 50% of the world's population has not used a single banking instrument in their entire life. It is a cash and carry population. What are the opportunities that this will provide?

We will now consider the growth impetus of the IT industry.

Many decisions in organisations, the government and society are opinion based decisions and not data based decisions. This is emotion based decision making and not intellect based decision making. We need systems which can analyse, model and simulate a problematic scenario and give a data based decision. For instance, a system which can simulate the potential traffic pattern and other impacts of building a flyover at a particular place would save time and cost in deciding whether to build a flyover based on the available data rather than relying on opinion. The possibilities of such decision making were raised in the 1960s by Professor Herbert Simon, Nobel laureate in economics and professor of computer science at Carnegie Mellon University.

As individuals, we use computers mainly as a productivity tool for emails, to seek information from various search engines, to create and manage personal networks and social media etc. As the computer is moving from a productivity tool to entertainment, where is the growth emphasis going to come from?

The devices too have evolved over time from client server, to LAN, WAN, Internet and now moving to cloud; from personal computer to laptop, tablet and the mobile phone. Our usage of the devices too has evolved.

A comparative study of mobile apps and Web usage reveals that while Web consumption per day, in the US from June 2010 to December 2011 has increased marginally from 64 min to 72 min, usage of mobile apps per day in the US has shown an increase from 43 min to 94 min.[2] The holiday week download of mobile apps globally shows that India has downloaded 10 million apps in one week (Dec 25—31, 2011) with the US topping the downloads at 509 million apps and China standing second at 99 million apps.[3]

What do these high numbers mean? What do we do to harvest? 1) We can change application development into building blocks. These blocks can then be assembled in different configurations to result in products. 2) We can invest in cutting edge R&D. Today, if we measure our contribution to the world knowledge in the engineering field by the number of papers published in top notch journals or the number of patents applied, it is 4%. We have moved up from 2.5% to 4% in the last decade[4] China moved from 3% to 17% in the same decade. Israel moved from about 6% to about 12%. The US came down to about 60%. 3) We must commercialise and encourage micro enterprises (HashCube is an example of such an enterprise) and cater to the growing Indian market with newer products. 4) We must enlarge and deepen e-governance initiatives. There is fairly large scope for Indian enterprises to build in this area.

Kishore Durg

We have recently released the Accenture Technology Vision 2011 that takes stock of the evolving trends in IT and how we think they will impact business and society as a whole. I would be happy to share our perspectives from the Vision. Our research team developed some 400 hypotheses on global trends based on inputs from scientists, architects and engineers. Of the 400 trends, we crystallised 50 and of the 50, we identified eight trends that businesses are going to bet on over the next few years (Table 4). IT is very important for India's future growth and it impacts our investment in the market, in what we sell and what we deliver.

Data is going to be the key, and it will be a driver in the next couple of years. Companies are going to spend a significant amount of money on analytics both in India and globally and analytics would be the key phase in our future trends. Cloud computing will create value higher up the stack. We found out that only 19% thought that cloud was hype, which was significantly lower than expected.

Architectures will shift from server centric to service centric. A case in point is Accenture's acquisition of Zenta.

[2] Sources: comScore; Alexa; Flurry Analytics.

[3] Source: Flurry Analytics and Estimates; Dec 25—31 2011; iOS and Android downloads.

[4] GLOBAL RESEARCH REPORT INDIA:Research and collaboration in the new geography of science October 2009, Thomson Reuters.

Table 4 Future trends of IT industry.

- Data takes its rightful place as a platform
- Analytics is driving a discontinuous evolution from BI
- Cloud computing will create more value higher up the stack
- Architecture will shift from server-centric to service centric
- IT security will respond rapidly, progressively—and in proportion
- Data privacy will adopt a risk-based approach
- Social platforms will emerge as a new source of business intelligence
- User experience is what matters

As in every typical IT organisation, you have management consulting, business processing heads, technology delivery and lot of these services now cut across the business services. The focus will be on business services cutting across the organisational boundaries as per the people and business requirements. The business services stream cutting across the organisational boundaries would be the focus area.

IT security will respond rapidly. Our study revealed that governments, including the Indian government, are spending heavily on IT security.

Social platforms will emerge as a new source of business intelligence. During a global leadership programme held in a client's firm, we realised that we were taking decisions based on the data available on social platforms rather than on databases such as Oracle or ERP platform. Their opinion of what they want to do with their internal leadership programme and how they want to streamline was debated much more than what they had planned to do.

Several companies, especially mobile companies are realising that it's not just about their architecture, it's about user experience and that will play a huge role in the business innovations. Table 5 details the technology trends in India.

Businesses have started finding out that social media provides a good business opportunity. Social media is not new. If you look at the growth of media, radio took 38 years to achieve 50 million users, television took 13 years, the Web took 4 years to achieve 30 million and Facebook did it in 3—5 months. The growth of digital social media has been explosive. Recently, the number of subscribers on Facebook touched 100 million users in just 9 months.

Today the world is moving very rapidly and IT has to catch up with it, solve the problems and deliver solutions. India has a huge market for all of these and we need to work on those areas.

Table 5 Technology trends and opportunities in India.

- Analytics
- Too much data, too little measurement and even fewer insights
- Need for constant innovation
- Data security.
- Cloud computing
- Social networks: Enabling a market for Me

Ananth Vaidyanathan

On the subject of 'Strategies to usher in the next phase of the IT industry', I have titled my presentation for today as 'Thriving in the new normal'.

Since we are talking here about 'phases' in the industry, the question which arises is, how many phases have we gone through? It is difficult to list all the phases that have gone by and what is coming next. Having gone through these phases though, the IT industry can be very proud of itself in terms of what it has achieved.

Looking back over the last decade, there were three big phases which mattered 1) The dotcom boom, 2) The dotcom bust and 3) The new normal, a term which came up in 2008.

Starting 2008, on the one side, we had the collapse of the Lehman brothers, the multitude of scams and frauds, (and unfortunately, closer home at one of the Indian IT industry companies). That changed a lot of things around us. Post Lehman there was a lot of focus on governance, accountability, transparency and ethics which affected the way we are supposed to be conducting our business. While that led to a new normal, there was something else happening in parallel.

That something which was happening in parallel was the emergence of a whole new consumer. Consumer behaviours, consumption patterns — driven to a large extent by the Gen Y, and the speed at which technology and innovation were being delivered, the speed of knowledge dissemination and use, everything changed around us.

Never before have we seen a more enhanced role of the Chief Information Officer (CIO) or the IT function. Many CIOs have actually gone on to become CEOs of companies now. CIOs are no longer talking about just delivering the IT function but they are talking about contributing to the business growth. CIOs are now part of the board, part of the business functions and they are at the table when the future of business is being discussed.

These trends put together have created the new normal. Fig. 2 shows the trends shaping the market in the coming decade.

The key strategic imperatives for organisations in the next phase are: to place the big bets; globalise; design the social structure of the organisation and focus on the employee. Do-it-yourself and do-it-together will have to go together. Co-innovation drives the speed of delivery of innovation. The entire innovation engine does not depend on a certain company or set of people or a hierarchy. Innovation does not happen in isolation anymore. The speed and nature of globalisation is changing. There is no better time to leverage your globalised workforce for driving co-innovation.

Sourav Mukherji

My hypothesis is that the Indian IT industry has been and is probably ignoring a very big opportunity that may be a lever of growth. Statements to the effect that technology should be used to transform the world and that Indian IT firms should use their talent to transform education and healthcare and solve societal problems were made by Sam Palmisano, who just retired as President and CEO of IBM when he came to India in 2011 as IBM was celebrating its 100th year and he was talking of leveraging IT for social

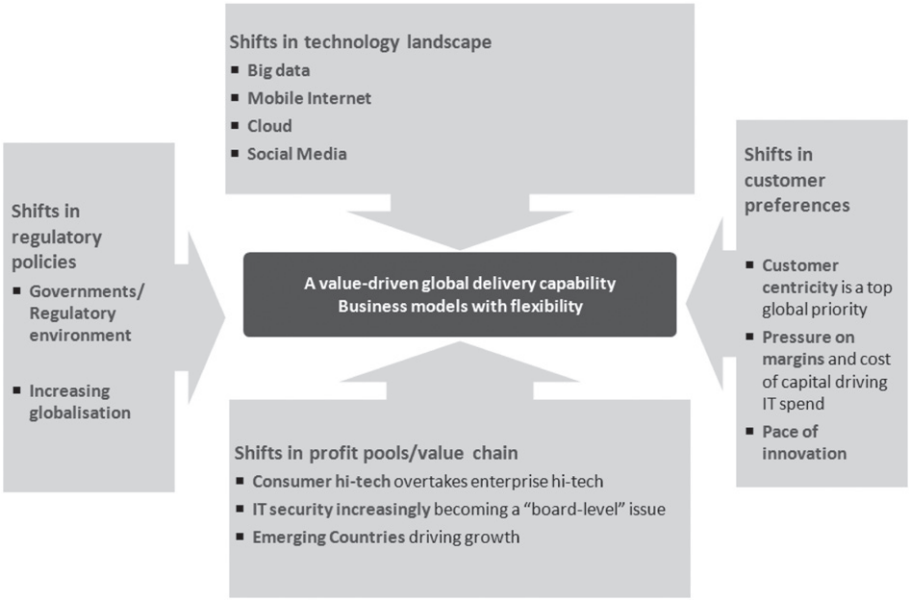


Fig. 2 Trends shaping the market in the coming decade. Source: McKinsey and Company Research Report.

change. An informal estimate of the poor in India indicates that 800 million people spend no more than Rs 20 a day. As you all know, IT can be used for social development, but the bigger question before the captains of industry is, can they address the needs of the poor and still make money? Fig. 3 highlights the reasons why the IT industry should serve the poor.

Employees would be more motivated to do their work if they can see the impact of their work. Engaging employees in bigger problems of the society might prove to be a very important lever of employee engagement. Muhammad Yunus of Grameen Bank fame talks about profit seeking commercial enterprises which can leverage talent, the ability to innovate, to direct and solve societal problems.

I have identified three parameters that make it difficult to address the needs of the poor in India. 1) The poor cannot pay, so there is an affordability issue. 2) The poor are geographically dispersed so there is an accessibility issue. 3) There is an issue about information asymmetry. All of these create problems for commercial profit seeking enterprises to make money by addressing the needs of the poor. Economics defines the combination of these three factors as market failure.

Market failures often prevent companies from doing well while doing good. Making a distinction between three zones, zone of opportunity, zone of tradeoffs and zone of disaster, Prof Karnani situates market failures in the middle zone, the zone of tradeoffs, where there is a misalignment

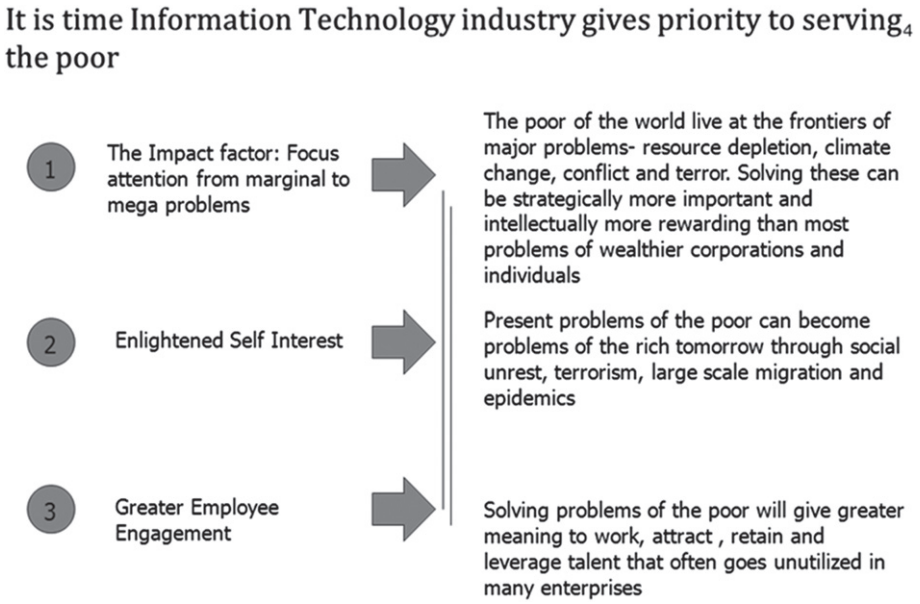


Fig. 3 Main factors to motivate the IT industry to serve the poor.

between corporate profitability and social growth (Karnani, 2011, p. 73). He states that wherever there is misalignment between social growth and corporate profitability, organisations would choose profitability over social growth. However, in the zone of opportunity, since profits are well aligned with objectives of social growth, organisations do not need to make a choice. The challenge is thus to move activities from the zone of tradeoffs to the zone of opportunity and technology can be an enabler in that direction. The power of information technology lies in correcting market failures because it can solve problems of accessibility, affordability and information asymmetry.

The definition of innovation says that whenever somebody makes a compromise be it your customer, or your customer's customer, that is where you are looking for innovation. Every bit of innovation is about overcoming some kind of compromise. IT and innovation driven by IT has a lot of potential to address the needs of the poor and break the compromise of addressing social welfare and profitability objectives. Let us look at some of the companies in India, which are private enterprises and are running sustainable businesses.

Healthcare problems have been identified as the biggest cause of making people poor, not only in India, but also worldwide. Poverty is not a static concept, it is a dynamic concept. The key problem of healthcare is that the patients and the market forces have a big separation between them and that is what IT is bridging. There are several examples from our own country, Aravind Eye Hospital, Narayana Hrudalaya, Neurosynaptic among several others who are trying to leverage different types of technology and skills innovations, such as para-skilling where the hospital decides that a doctor is not needed for doing the entire operation. In order to leverage this and get the required footfalls, they use IT to do a video conferencing with the patients. Narayana Hrudalaya operates on cross-subsidisation. They charge affluent patients a little bit more so that they can cross-subsidise the poor patients. But their price is still lower, compared to the market. This is possible because they have huge economies of scale, so that's where the innovation comes in.

Today we spend about 2.3% of our GDP on education. Magnifying this by two or three times will still be insufficient to provide universal education. Gyan Shala is an organisation which has actually pioneered a new model in delivering literacy. They cut down the high costs of hiring high end teachers in the class. Instead their courses are designed by these teachers and are imparted in class by a person who is not as educated. There is the added benefit of the person belonging to the same community as the students and hence, being able to understand their needs better. It's equivalent to a para-skilling model where you deliver treatment by using the doctor to do only specialised tasks while the paramedic does the standardised tasks under the supervision of the doctor.

Ninety-three percent of India's working population belongs to the unorganised sector. So only 7% of the population is fortunate enough to be covered by security, PF, gratuity, etc. This has resulted in a tremendous amount of information asymmetry. A successful initiative in this space is a company called Babajobs.com operating out of India, started by Sean Blagsvedt, a Microsoft research employee. He has set up an interactive Web based interface, which connects both the demand and the supply side of informal labour market, connecting informal labour with prospective employees. It has a well developed Web interface and also a mobile phone interface. Since even the very poor people in India are likely to carry a mobile phone today, this feature is very convenient and useful.

Finally I would like to talk about Rural Shores, a company which is taking business process outsourcing (BPO) jobs to the villages. They have taken the transaction processing jobs such as cheque processing to the villages. This helps the company overcome high employee attrition (unlike their urban counterparts) and provide employees a better lifestyle. They are establishing a model and today they already have seven centres all over India in a three year time frame, employing about 1000 rural youth. They are creating a tremendous amount of social impact as they are able to employ many women in those centres, who would not have migrated to cities to work in urban BPOs, and they are injecting cash into village economies.

Irrespective of whether any of these technology solutions can be replicated or not, it is obvious that the poor are likely to buy healthcare and education services to become more productive. And one can build models where they can pay.

However, these companies were not built overnight and neither are these models absolutely perfect. They faced several challenges, mostly from non-technological sources. Table 6 lists some of the possible challenges that one may encounter in deploying technology for social benefit.

So, while establishing a BPO centre in a village, one of the problems may be that women's empowerment would meet resistance. While setting up a hospital in rural India, the local quacks could convince people not to go to private hospitals. Organisations have to compete with local conditions and there are various ways in which they are trying to overcome the challenges. Although it is not easy, the wealth of talent in the IT industry should focus on this segment. It would be a tragedy to say that India has a huge IT consumption but that consumption is confined to 300 million people only. We have the choice of pushing IT consumption in India, but concentrating on and confining it to a few people or we can change our business models and create this utopia where there is democratisation of IT usage. If we want the latter, IT organisations need to spend a lot of time thinking about these new models. Front loaded investments may not give them quick returns but at the end of the day, hopefully this will give the Indian IT industry an important lever of growth.

Discussion

N M Agrawal : The six presentations gave us a feel of the present initiatives by the industry and the direction for growth as perceived by the academia. Now we invite the audience to raise questions and share their thoughts.

Audience: Mr. Ananth, you were talking about the ongoing changes, the next 'new normal', globalisation and co-innovation that will allow you to focus on social structure. This is going to bring in a lot of people from diverse backgrounds. So a lot of investments have to be made in

Table 6 Possible challenges in deploying technology for social development.

Challenges of deploying technology for development often comes from outside the domain of technology	
Healthcare:	Education:
1. Dependence of people on local practitioners (quacks) in the face of information asymmetry 2. Availability of complimentary infrastructure such as diagnostic labs, blood banks, medicines 3. Providing health service to bottom 30%	1. Separation of content from delivery might provide literacy but not education — are we ready to make the cost ∼ quality tradeoff? 2. Will the model work beyond primary education? 3. Benefits of educations is long term — will the poor be able to spend now for future benefit?
Informal Labour: 1. How to liberate the informal labour from the vicious cycle of poverty? 2. Needs for identification, financial inclusion, insurance and training 3. Charging proper prices for the services rendered in the face of very high supply	Rural BPO: 1. Convincing the customer that it is possible to deliver high quality service from remote locations 2. Physical infrastructure 3. Local knowledge to work with community 4. Vulnerability of employees

relationships management and on managing differences. Does HCL already have a system in place to manage that or are you still going the traditional way of escalation and taking informal routes to resolve that?

Ananth Vaidyanathan: There are two parts to this question. The first part about relationship management and globalisation is something which not just HCL, but I can safely say that most organisations have invested heavily in. The other significant point is the diversity element. Even though companies talk about different nationalities, the percentage of Indian population is rather high even now. There are very few who can actually claim to have changed that substantially. So, I think it's not so much of a relationship management problem as much as, from a co-innovation perspective, creating a diversity agenda. This is not a new agenda. It has been in practice for the past few years. But the pace at which it is changing is rather high. This requires a huge amount of change in the way you are coaching your employees to react to diversity.

Audience: I would like to bring the panel's attention to three points. How are we moving towards outcome based pricing? How are the big companies leveraging their current services set up and transitioning into product based business? In lieu of the non-linearity of revenue generation (10% people generating 18% of the revenue), how easy is the transition from service to product?

Sean Narayanan: I think the structure of creating products is changing. As a services industry, the larger you get, the transition to product based model gets more difficult. So, model innovation services, shared services models, creating platforms based delivery of services is going to be the way that organisations are going to change. But from a product perspective, you are going to see more and more of small co-innovation led product companies with very few people. And larger companies are going to integrate these products into the services they offer rather than just as a product.

S Balasubramanya: I will add a different context to your question and also to one of the points that Professor Sourav Mukherji mentioned. In the consumer goods experience, take the classic shampoo case study. You can buy a packet of shampoo at about one rupee and it is used regularly by the segment of the population such as construction workers and migrant workers who might not buy it otherwise. If you take the unit cost of one rupee and translate that to 1 L, your price per litre is far higher. The packaging cost and distribution cost is possibly a higher component of one rupee than the actual cost of the shampoo. The same thing might happen in the IT industry.

Banking services for rural banks can be set up, wherein the banks only pay the monthly rental and we take care of the hardware, software, application etc. TCS is already providing the service to several rural banks and small co-operative banks. This also extends to pay per account or pay per transaction, an outcome based model, as Sean mentioned.

India has become a great market place to experiment many of these models which are difficult in other established markets. How did the pricing in telecom come down? India is the biggest market, possibly with the lowest cost per minute and India was the one which introduced per second billing and many value added services. With outcome based pricing, one must look at it from a larger viewpoint and price it and package it appropriately.

Today a large amount of cutting edge technology is happening in India. In many multinational organisations a lot of advanced technology products are being created. People are not only coming to India for its low cost workforce, but also for core material research. The Jack Welch Technology Centre in ITPL is promoting core material research to bring down the overall cost of any product worldwide, whether it is plastics or parts of the aircraft engines. This is what I would like to add to Sean's comment on that question.

N M Agrawal : It was wonderful to have you all here. Thank you so much for bringing in very interesting and new perspectives on what is happening in the IT domain and what more needs to be done. IT is an important resource and we should collectively enhance its uses and contribute towards making this world a better place to be.

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